L 21218-65 EEO-2/EWT(d)/EEC-4/EPR Pn-4/Po-4/Pp-4/Pq-4/Pg-4/Ps-4/Pk-4/
ACCESSION NR: AP5000074 Pl-4 AFTC(a) BC S/0209/64/000/003/0036/0039

AUTHOR: Shishkov, A. (Colonel, Military navigator first class), Cherepivskiy, K. (Engineer, Lieutenant colonel)

TITLE: The navigation system in an airplane

SOURCE: Aviatsiya i kosmonavtika, no. 3, 1964, 36-39

TOPIC TAGS: course indicator, gyroscope bearing, gyroscope error compensation, navigation system error, navigation aid

ABSTRACT: The peculiarities and difficulties which should be taken into account when using the navigation system in an airplane are discussed, and various recommendations are analyzed which would facilitate the navigator's function in flight with respect to coordinating the navigation instruments. The error in magnetic course readings when coordinating the course system in the KM magnetic correction regime on the flight line is discussed. It is stated that, prior to takeoff, navigators must check the readings of the system's indicators in all its operating regimes on the main and standby gyro-assemblies. The author points out that the navigator must known the mean magnitude of gyro-assembly azimuth wander. The article gives a detailed explanation of how to determine this magnitude. It is stated that the navigation system cannot always be used

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ACCESSION NR: AP5000074

in the MK regime when powerful users of electrical energy are switched on. The article also states that it is best to switch to a GPK regime when following a precise routine. The author concludes that all these recommendations need to be discussed and refined so that simpler and more effective methods may be developed for using the navigation system in airplanes and other aircraft. Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: AC, NG

NO REF SOV: 000 OTHER: 000

Card 2/2

SHISHKOV, A.

"Orgtekhstroi" is a guide of technical progress in construction projects. Na stroi.Ros. 6 no.2:12 F '65.

(MIRA 19:1)

1. Upravlyayushchiy trestom TSentroorgstroy.

SHISHKOV, A.F., master.

Converting a generator to oxygen cooling. Energetik 5 no.4:19-20 Ap '57. (MLRA 10:6)

(Electric generators)

SPECIAL ACV, A

62

The effect of hydrostatic pressure on the magnetic saturation of iron at the temperature of liquid nitrogen. F. M. Gal'perin, S. Larin, and A. Shishkov. *Doklady Akad. Nauk. S.S.S.R.* 89, 419–22(1953).—An Armco-Fe rod 570 mm. long and 5.75 mm. in diam. was subjected to hydrostatic pressure up to 2000 atm. by a gas within a nonferromagnetic bronze compression chamber in a field of 1800 to 2000 oersteds and at temps. of 20° and −196°. The measuring circuit contained 2 coils connected in opposition to compensate for changes in the magnetizing current. The changes in magnetic flux as the pressure was decreased were observed by Grassot-type fluxometer readings. Satn. magnetization of the Fe was 1690 gauss. The value of $\Delta\psi/\psi_0 \Delta p$, where ψ_0 was the flux at 1 atm., was detd. from 22 measurements and was 0.55 ± 0.25 × 10^{-7}/atm. at −196° and 0.24 ± 0.1 at 20°. The quantity $d\sigma/\sigma dp = (d\psi/\psi_0 dp) - (\chi/3)$, where σ is the magnetic satn. per unit mass and $\chi = 5.82 \times 10^{-7}$/atm. is the coeff. of compressibility, was calcd. from the above values and was −1.39 ± 0.25 and −1.70 ± 0.1 × 10^{-7}/atm., resp. A formula previously obtained by G. for the at. magnetic moment of Fe was used to obtain the calcd. value $d\sigma/\sigma dp = -1.49 \times 10^{-7}$/atm.

A. G. Guy

(2)

SHISHKOV, A. G., LEDNEV, I. A., and TELESNIN, R. V. (Moscow)

"Magnetic viscostiy of Ni-Zn Ferrits on the Free and Forced Change of the Magnetization," a paper submitted at the Internatonal Conference on Physics of Magnetic Phenomena, Sverdlovsk, 23-31 may 56.

SHISHKOV, A.G.

AUTHORS: Telesnin, R.V., Shishkov, A.G., 56-4-2/54

TITLE: The Influence of Magnetic Viscosity on the Frequency Properties of Ferrites. (Vliyaniye magnitnoy vyazkosti na chastotnyye svoystva ferritov)

PERIODICAL: Zhurnal Eksperim.i Teoret.Fiziki, 1957, Vol.33, Nr 4, pp.839-844 (USSR)

ABSTRACT: The effect of the magnetic visoosity is measured by 2 methods:
a) Aperiodic regime: The sample is given the possibility of free exchange in the magnetization.
b) Forced regime: The magnetization is forced on the sample by a sinusoidal field with the frequency. f. The investigations were performed with 5 different samples and furnished the following characteristic results:

Nr of the sample	chemical composition $NiFe_2O_3$	$ZnOFe_2O_3$	sintering temperature in °C	aperiodic regime τ max s	τ_{CK} sec Oe/G	frequency properties s,Oe,sec	h_o mOe
1	15,3	34,7	1350	20	$2,7 \cdot 10^{-8}$	$3,2.10^{-6}$	35
2	17,4	32,6	1275	7	$3,3.10^{-8}$	$0,9.10^{-6}$	85
3	17,4	32,6	1320	25	4.10^{-8}	$1,9.10^{-6}$	60
4	17,4	32,6	1375	40	$4,3.10^{-8}$	$2,2.10^{-6}$	45
5	17,4	32,6	1400	21	$4,3.10^{-8}$	$1,4.10^{-6}$	40

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SHISHKOV, A.G.

24(3)

Author: D'yakov, G.P., Candidate of Physical-Mathematical Sciences SOV/55-58-2-34/35

TITLE: Survey of Papers Read by Scientists of Moscow University at the All-Union Congress on the Physics of Magnetic Materials (Obzor dokladov uchenykh moskovskogo universiteta na vsesoyuznom soveshchanii po fizike magnitnykh materialov)

PERIODICAL: Vestnik Moskovskogo Universiteta. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1958, Nr 2, pp 247-250 (USSR)

ABSTRACT: From December 6 - 11, 1957 there took place the fourth Union Congress on physics of magnetic materials in Leningrad. (The first two meetings took place 1946 and 1951 in Sverdlovsk, the third meeting 1956 in Moscow). The congress was organized by : Academy of Sciences of the USSR, Department of Physical-Mathematical Sciences, Scientific Council on Fundamental Problems of Magnetism, Institute for Semiconductors of the Academy of Sciences, USSR and Committee for Magnetism. There were more than 500 participators, 59 lectures were given, among them the following lectures of the representatives of the Moscow State University :

1. Professor R.V. Telesnin, Ye.F. Kuritsyna, Lecturer "On the Velocity of Magnetic Reversal of the Ferromagnetics".
2. Professor R.V. Telesnin, Ye.V. Karpnagina, Assistant "On Magnetic Viscosity of Ferrites".
3. Professor R.V. Telesnin A.G. Shishkov, Aspirant "Effect of Magnetic Viscosity on the Frequency Characteristics of Ferrites".
4. M.V. Degtyar, Lecturer "Variations of Structure and Anti-ferromagnetic Properties of Ni_3Fe".
5. M.A. Grabovskiy, Lecturer, S.Yu. Brodskaya, Junior Scientific Assistant "Magnetic Properties of Anisotropic Stones".
6. G.P. D'yakov, Lecturer "Magnetostriction Properties of Binary Alloys".
7. Professor Ye.I. Kondorskiy, L.V. Sobolev, Assistant "Electric Properties of Ni-Zn-Ferrites".
8. N.S. Kiryasov, Senior Scientific Assistant, A.P. Parpanov, Aspirant "Magnetic Properties and Structure of Manganese - Boron - Alloys".
9. N.A. Smol'kov, Senior Scientific Assistant, B.P. Belov "Some Properties of Ferrites".
10. N.A. Smol'kov, Senior Scientific Assistant, Yu.P. Pimenov, Lecturer "Properties of $Ni Fe_2 O_4$ - $Mg Fe_2 O_4$ ".
11. N.A. Smol'kov and Ye.I. Popenko, Engineer "Properties of Ferrites in the High-Frequency Range".
12. Professor K.P. Belov, K.M. Bol'shova, Lecturer, T.A. Yelkina, Lecturer, and M.A. Zaytseva, Junior Scientific Assistant "Ferrites With Compensation Point".
13. K.P. Belov, Ye.V. Talalayeva, Assistant "Electric and Galvanomagnetic Properties of the Manganese Ferrites".
14. T.A. Timofeyeva, Junior Scientific Assistant, A.V. Zalesskiy "Production of Monocrystals of Ferrites".
15. Professor K.P. Belov, A.V. Ped'ko, Junior Scientific Assistant "On Galvanomagnetic Properties of Ferromagnetic Alloys Near the Absolute Zero of Temperature".

The participators of the meeting visited a laboratory of the Institute of Semiconductors of the Academy of Sciences of the USSR (Professor D.N. Nasledov).
The meeting was concluded by Professor S.V. Vonsovskiy, Corresponding Member, Academy of Sciences, USSR with the [illegible] of the following Union Congress planned for 1958.

1. Magnetic Resonance and Galvanomagnetic Effects in Kazan'.
2. Ferromagnetic Semiconductors [illegible] in Minsk.
3. [illegible] Structure of the Ferromagnetics and Paramagnetic Effects [illegible] in Krasnoyarsk.

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SHISHKOV, A. G., Cand of Phys-Math-Sci--- (diss) "The Influence of Magnetic Strength on the Frequency Properties of Nickel-Zinc Ferrites," Moscow, 1959, 12 pp (Moscow Univ State Univ imeni M. V. Lomonosov) (KL, 6-60, 121)

4 (3)

AUTHORS: Belesnin, R. V., Mishkov, A. G. SOV/48-23-3-13/34

TITLE: The Influence of Magnetic Viscosity on the Frequency Properties of Ferrites (Vliyaniye magnitnoy vyazkosti na chastotnyye svoystva ferritov)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 3, pp 347-351 (USSR)

ABSTRACT: Normally, the magnetic viscosity of materials is investigated by means of two independent methods: 1) the [illegible] aperiodic change of the magnetic field, 2) the variable sinusoidal change of the magnetic field are used. In the present paper the two dependences are compared in the case of the change of the amplitude of the magnetic field, of the frequency, of the variable magnetic field and of temperature. Such investigations of the magnetic viscosity were carried out for the first time on the same sample by means of two methods. In order to facilitate the comparison under periodic conditions an "instantaneous" change of the magnetic field was brought about symmetrically (from $+H_0$ to $-H_0$). Accordingly, magnetization also changed from $I(+H_0)$ to $I(-H_0)$ in the

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course of time.(Fig 1). 6 toroidal nickel-zinc-ferrite-samples (17.4 % mol NiO and 32.6 % mol ZnO) which were annealed in the course of 4 hours at different temperatures (1200-1100°) were investigated. The results obtained at room temperature were described already earlier (Ref 7). In figure 2 the dependence of magnetic viscosity on the potential of the magnetic field H_o at room temperature is given for samples.

Similar measurements were carried out with all samples and at different temperatures. In this connection a regularity was observed: the viscosity of the ferrites increases with the decrease in temperature. The temperature dependence of viscosity, however, consists of the temperature dependence of magnetic permeability and of the constant of magnetic friction Ω. For this reason the temperature dependence τ/χ_{max} shown in figure 3 is especially important. The same samples were also investigated with respect to the dependence of frequency in the same fields as described in the first chapter of the paper. At a constant amplitude of the variable

magnetic field H_o this proved - as was the case also in reference 7 - to be of the same type as in figure . In the case of sufficiently weak fields where there is only a reversible permeability and where the Barkhausen effects are lacking the magnetic permeabilities μ_1 and μ_2 do almost not depend on the frequency. On figure 5 the dependence of the critical frequency f_{kr} on H_o at room temperature is represented for the Ni-sample. If the field tension is increased the dependence of the critical frequency becomes linear. Experiments have shown that such a bend of the curve is observed in relatively weak fields at any temperature. The magnitude of the critical field $h_o(T)$ may be easily determined from curves similar to those on figure 6 by extrapolating the linear part. According to reference 17 the amount of Ω S may be determined from the inclination of the curve towards the axis of coordinates. The values thus obtained of the samples investigated are given in figure 7. The temperature dependence of the critical fields h_o and

the coercive force H_c are shown in figure 8. As could be expected the temperature dependence of h_o almost totally reflects the temperature dependence of H_c. The comparison of the temperature course of the frictional constant Ω S with the temperature dependence of the "specific" magnetic viscosity τ/χ_{jump} also shows good agreement in a wide range. This confirms again that the quantity τ/χ_{jump} characterizes the quantity Ω. It is of special importance that with both methods (pulse and periodic conditions) a considerable intensification of the magnetic friction at a temperature decrease was obtained. The magnetic friction of metallic ferromagnetics is due to the electric conductivity and the inhibiting effect of the eddy microcurrents. There are 8 figures and 8 references, 7 of which are Soviet.

ASSOCIATION: Fizicheskiy fakul'tet Moskovskogo gos. universiteta im. M. V. Lomonosova (Physics Department of the Moscow State University imeni M. V. Lomonosov)

24(3)

AUTHOR: Shishkov, A. G. SOV/48-23-3-33/34

TITLE: On the Report by V. A. Fabrikov, V. D. Kudryavtsev, and Z. M. Gushchina (Po dokladu V. A. Fabrikova, V. D. Kudryavtseva i Z. M. Gushchinoy). "Ferrites With Strong Saturation Magnetization and a Narrow Resonance Absorption Curve at Superhigh Frequencies" (Vol 23, Nr 3, p 372) ("Ferrity s bol'shoy namagnichennost'yu nasyshcheniya i uzkoy rezonansnoy krivoy pogloshcheniya na sverkhvysokikh chastotakh" (t.23, No 3, str.372). Nickel-copper-ferrites With a Small Resonance Absorption Curve at Superhigh Frequencies (Nikel'-mednyye ferrity s uzkoy rezonansnoy krivoy pogloshcheniya na sverkhvysokikh chastotakh)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 3, pp 423-424 (USSR)

ABSTRACT: The thesis on the proportionality between the width of the line of resonance and the limit frequency ($\Delta H \sim \omega_{limit} = \gamma H_{diff}$) mentioned by the reporters results clearly from the frequency function of the spin relaxation in the known equation by Landau and Livshits. A correlation between the frequency of spin relaxation and the friction constant of the mobile limit

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On the Report by V. A. Fabrikov, V. D. Kudryavtsev, SOV/48-23-3-33/34
and Z. M. Gushchina. "Ferrites With Strong Saturation Magnetization and a Narrow Resonance Absorption Curve at Superhigh Frequencies" (Vol 23, Nr 3, p 372). Nickel-copper-ferrites With a Small Resonance Absorption Curve at Superhigh Frequencies

may, on the one hand, explain the friction mechanism in the displacement of the limit by the frequency of spin relaxation, on the other hand, this correlation will presumably give an explanation of the nature of the frequency of the spin relaxation λ by explaining the nature of magnetic friction (α). The authors pointed out that copper-nickel-ferrites have two critical concentrations (14.5 % and 33 % Cu). Outside these limits an intense widening of the resonance line is observed. The first critical concentration coincides with the enlargement of the cores if the magnetic properties of the material improve. In the range of the second critical concentration the electric resistance becomes considerably weaker in the case of increasing copper content. There is obviously a certain relationship between conductivity and friction constant and further also between conductivity and width of the resonance line ΔH. In the case of a higher copper content the conductivity of the ferrite increases considerably, which entails also an increase

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On the Report by V. A. Fabrikov, V. D. Kudryavtsev, SOV/48-23-3-33/34
and Z. M. Gushchina. "Ferrites With Strong Saturation Magnetization and a Narrow Resonance Absorption Curve at Superhigh Frequencies" (Vol 23, Nr 3, p 372).
Nickel-copper-ferrites With a Small Resonance Absorption Curve at Superhigh Frequencies

in the friction constant Ω and, consequently, also in the relaxation frequencies and the widths of the resonance line. At present there are several methods available for the determination of the constant of magnetic friction: 1) The frequency dependence of initial permeability; 2) experiments carried out on monocrystals, in connection with the investigation of the velocity of the boundary shift between the domains as a function of the applied constant magnetic field; 3) the determination of the velocity of magnetic reversal of polycrystalline samples with rectangular hysteresis loops; 4) experiments on ferromagnetic resonance (width of the line); 5) the investigation of magnetic viscosity under pulse conditions; 6) the frequency dependence of permeability near the coercive force. The existence of a correlation between the processes of magnetization by means of rotation and substitution - as found by L. D. Landau and Ye. M. Livshits - permits a comparison of the measurement results according to the

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methods 1, 2, and 4. In spite of the great differences with respect to frequencies, potentials of the magnetic field and mechanisms of magnetization, these methods yield quite similar values of the friction constants.

33126
S/105/62/000/002/002/002
E032/E514

24,2200 (1147,1158,1164)

AUTHORS: Shishkov, A.G., Candidate of Physico-mathematical Sciences, Ivanov, Yu.D., Engineer and Gladkov V.M., Engineer (Moscow)

TITLE: An instrument for the oscillographic measurement of the dynamic magnetization curve of ferromagnetics

PERIODICAL: Elektrichestvo, no.2, 1962, 68-71

TEXT: The importance of the dynamic magnetization curve in studies of the properties of ferromagnetics is pointed out. This curve is defined as the geometrical locus of the end points of the hysteresis loops obtained with a monotonically increasing amplitude of a symmetrical alternating magnetic field. Existing methods for studying magnetization curves of ferromagnetics are said to consume a great deal of time. Oscillographic methods on the other hand are more convenient. In the present paper the authors describe an apparatus which can record oscillographically a family of symmetric hysteresis loops which are obtained with an amplitude modulated sinusoidal magnetizing current. A block diagram of the device is shown in Fig.1. The master oscillator

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produces a sinusoidal voltage at 500 cps. This voltage is fed into the modulator 4 which also receives a 25 cps voltage signal from the oscillator 2. In the modulating stage the 500 cps signal is amplitude modulated and the modulation coefficient may be varied from 0 to 100%. The load of the modulating stage is a transformer whose primary is connected in parallel with a capacitance. This circuit is tuned to 500 cps. The magnetizing current is regulated by voltage changes across a load resistance placed across the secondary of the transformer. This voltage is fed into a current amplifier which is tuned to 500 cps. The magnetizing current is measured by an ammeter in the magnetizing circuit. The magnetizing circuit also includes a resistor R which provides the horizontal sweep for the oscillograph. A double-beam oscillograph is used to produce simultaneously two images on the screen so that the characteristics of two specimens can be compared. The voltage across the secondary wound on the specimens is fed through an integrator into an amplifier and then into the vertical plates of the oscillograph. As a result a family of symmetric hysteresis loops appears on the screen

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33126

An instrument for the ... S/105/62/000/002/002/002
E032/E514

In order to produce the dynamic magnetization curve, the apparatus includes a pulse-shaping circuit which controls the brightness of the CRO beam. . These pulses are produced from the 500 cps signal and are fed into a phase reversing stage which is used to shift the pulses by up to 180° relative to the extremal point on the magnetization current curve. From the phase shifter the signal is fed into a circuit which produces sharp pulses at twice the frequency. These pulses pass through a limiter and amplifier and are applied to the modulating electrode of the CRO tube, thereby producing brightness modulation. The errors of measurements along the vertical and horizontal channels are of the order of 5%. G. S. Veksler is mentioned for his contributions in this field (Elektrichestvo, 1962, No.10). There are 5 figures.

SUBMITTED: September 10, 1961

Card 3/4

ACCESSION NR: AP4039597 S/0126/64/017/005/0693/0697

AUTHORS: Telesnin, R. V.; Sarayeva, I. M.; Shishkov, A. G.

TITLE: Magnetic anisotropy of films obtained with the simultaneous action of an external magnetic field and an oblique inclination of the molecular beam

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 5, 1964, 693-697

TOPIC TAGS: magnetic anisotropy, magnetic field, molecular beam, permalloy, magnetization

ABSTRACT: The position of the axis of easy magnetization in permalloy films deposited under the simultaneous action of an external magnetic field and a slanting inclination of the molecular beam at both high and room temperatures was studied. The permalloy films, deposited on optically polished glass plates in a vacuum of $5 \cdot 10^{-5}$ mm Hg had a composition of 84% Ni, 16% Fe, ~1% Mo. The experimental setup (see Fig. 1 on the Enclosure) permitted the straight, active section of the permalloy-coated tungsten wire evaporator to be positioned either parallel to or perpendicular to the external magnetic field H. The angle between the metal beam and a plane normal to the base plate was 14° at positions a and b, and was 3° at positions c and d. Angle θ of the easy magnetization axis was

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ACCESSION NR: AP4039597

measured in respect to the 85-oersted uniform magnetic field produced by a pair of Helmholtz coils. Film thicknesses were measured by the many-pronged interference method. The anisotropy, coercive force and θ on the films were measured as described by V. V. Kobelev (Sb. Magnitnyye elementy* ustroystv vy*chislitel'noy tekhniki, Izd AN SSSR, M., 1961, p.131) at 1000 cps with the base plate at room temperature and at 300C. The "self-shadowing" effect of a straight evaporator in the absence of an external magnetic field should direct the easy magnetization axis parallel to the linear evaporator, but this effect was observed experimentally only with the base plate at room temperature and at 14° to the beam. In the other three cases the anisotropy was basically directed by the spontaneous magnetization. With the evaporator parallel to H, at room temperature the axis of easy magnetization was parallel to H and the magnitude of the field of anisotropy was larger at 14° than at 3°; at 300C the axis varied with each sputtering, but within a narrower limit of θ than with no external H. With the evaporator perpendicular to H, the easy magnetization axis fell between both directions (e.g., at a, $\theta = \frac{\pi}{4}$ (see dash line in Fig. 1 on the Enclosure7). At 300C θ was closer to 0 because the inclined beam exerted a lesser effect and the axis scatter was greater than at room temperature (the orientation action of H was decreased at this temperature). The anisotropy energy is not directly additive but must contain a term to account for the interaction effect of the slanting beam with the external H. This added

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ACCESSION NR: AP4039597

function is axisymmetrical and must be expressed by even periodic functions of θ. The direction of the easy magnetization axis may be determined from the equilibrium conditions of this function. Apparently at room temperature the slanting beam had the ability to create elongated networks of crystallites which disrupt the uniformity of a plane, hindering the boundary shifting. Orig. art. has: 1 figure, 3 tables, and 6 equations.

ASSOCIATION: Moskovskiy gosuniversitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 24Jun63 ENCL: 01

SUB CODE: MM NO REF SOV: 002 OTHER: 005

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ACCESSION NR: AP4036507

ACCESSION NR: AP4039591

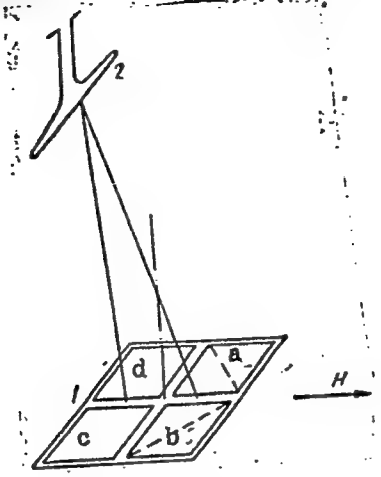

Fig. 1. Relative position of the base plate holder (1), evaporator (2), and external magnetic field (H).

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L 31842-65 EWT(1)/EWT(m)/T/EWP(t)/EEC(b)-2/EWP(b) IJP(c) (W/JD

ACCESSION NR: AR5005661 S/0058/64/000/012/E121/E121

SOURCE: Ref. zh. Fizika, Abs. 12E1005

AUTHORS: Buravikhin, V. A.; Shishkov, A. G.

TITLE: Domain structure and anisotropy of thin ferromagnetic films

CITED SOURCE: Uch. zap. Irkutsk. gos. ped. in-t, vyp. 21, 1964, 19-94

TOPIC TAGS: thin film, ferromagnetic film, domain structure, crystal structure, anisotropy

TRANSLATION: Review. The authors consider in detail numerous experimental investigations of the structure and fundamental magnetic properties of thin ferromagnetic films. Content of the review: 1) Introduction. 2) Crystalline structure of thin ferromagnetic

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S/0048/64/028/003/0572/0579

ACCESSION NR: AP4023409

AUTHOR: Telesnin, R.V.; Il'icheva, Ye.N.; Kanavina, N.G.; Kolotov, O.S.; Nikitina, [illegible]; Shishkov, A.G.

TITLE: Investigation of some dynamic properties and the domain structure of thin iron-nickel films /Report, Symposium on Ferromagnetism and Ferroelectricity held in Leningrad 30 May to 5 June 1963/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v.28, no.3, 1964, 572-579

TOPIC TAGS: thin ferromagnetic films, thin permalloy films, thin film domain structure, thin film coercive force, film magnetization switching, thin film hysteresis

ABSTRACT: The dispersion of the direction of the anisotropy axis, magnetization reversal (switching) time, coercive force, and anisotropy field were measured for a number of thin films of permalloy 79NMA. Changes in the domain structure of the films during quasistatic magnetization reversal were observed by means of the magnetooptical [illegible] effect. The films were vacuum deposited on polished glass at various temperatures and with various values of applied magnetic field. The dispersion of the anisotropy was measured by a slight modification of the method of D.O.Smith

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ACCESSION NR: AP4023409

(J.Appl.Phys.33,1399,1962). The field $H_{0.7}$ at which the flux linking the transverse coil reached 0.7 of its maximum value was taken as a measure of the dispersion. Both $H_{0.7}$ and the switching ratio (the product of the magnetization reversal time by the excess of the magnetizing field over the coercive force) behaved similarly as functions of the temperature and magnetic field at deposition. From this it is concluded that the dynamic properties of the films are determined by the dispersion of anisotropy. Curves showing the reciprocal of the magnetization reversal time as a function of the magnetizing field in the presence of a constant transverse field were straight lines having a single sharp bend. The bend is interpreted as indicating a transition from magnetization by uniform rotation to magnetization by non-uniform rotation. The product of the magnetizing field and the transverse field at the transition was a linear function of $H_{0.7}$ for films of the same thickness. From an analysis of the rather complex hysteresis phenomena observed in films with a tapering edge (thickness falling to zero over a distance of 1 or 2 mm), and from observations of the accompanying changes of domain structure, it was possible to determine the field at which reverse magnetization nuclei began spontaneously to form. This field was 2.0 Oe for nearly all the films, regardless of thickness. Critical curves for magnetization reversal in slowly changing fields making various angles

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ACCESSION NR:

L 50958-65 EWT(l)/EPA(s)-2/EWT(m)/EWP(i)/EWA(d)/T/EWP(t)/EEC(b)-2/EWP(z)/EWP(b)
Pt-7/Pi-4 IJP(c) MJW/JD/GG

ACCESSION NR: AP5011436 UR/0048/65/029/004/0586/0590

AUTHOR: Telesnin, R.V., Saray/va, I.M.; Shishkov, A.G. 52 E

TITLE: Anisotropy of thin Permalloy films, produced by a field or by oblique incidence of the molecular beam /Report, Second All-Union Symposium on the Physics of Thin Ferromagnetic Films held in Irkutsk, 10-15 July 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 4, 1965, 585-590

TOPIC TAGS: ferromagnetic thin film, magnetic anisotropy, permalloy, magnetic property

ABSTRACT: The purpose of the present work was to investigate the magnetic anisotropy of Permalloy films deposited in vacuo in the presence of a magnetic field and with oblique incidence of the molecular beam. The aim was to determine how the effects of these two anisotropy-causing factors supplement each other, for it is of interest to know the rules governing the summation of the anisotropies induced by different factors. The 600 Å thick 79NMA Permalloy films were deposited from a point source (a tungsten spiral) onto glass substrates covered with a mask with round apertures arranged on circumferences of circles. This

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ACCESSION NR: AP5011436

resulted in series of deposit spots in which the film was deposited at different angles in steps from 0 to 20°, i.e., a sort of deposition matrix. The films were deposited in a vacuum of 10^{-5} mm Hg at room temperature. The results are presented graphically in the form of curves of the relative angle of the easy axis and the resultant anisotropy versus the defining deposition angles. On the basis of the experimental results it is concluded that the anisotropy energy induced by oblique incidence and the anisotropy energy induced by a field are additive (as vector quantities). Orig. art. has: 3 formulas and 4 figures.

ASSOCIATION: None

SUBMITTED: 00 ENCL: 00 SUB CODE: EM, EC

NR REF SOV: 004 OTHER: 002

Card 2/2

L 50978-65 EWT(l)/EPA(s)-2/EWT(m)/EWP(i)/T/EWP(t)/EEC(b)-2/EWP(b) Pt-7/Pi-4
IJP(c) JD/GG

ACCESSION NR: AP5011462 UR/0048/65/029/004/0699/0701

39
38
B 21

AUTHOR: Shishkov, A. G.

TITLE: Concerning the polarity of Bloch walls in thin ferromagnetic films (Comments on the reports of Buravikhin and others) /Report, Second All-Union Symposium on Thin Ferromagnetic Films held in Irkutsk 10-15 July 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 4, 1965, 699-701

TOPIC TAGS: ferromagnetic thin film, domain structure

ABSTRACT: The paper consists of a series of interpretive comments departing from some questions suggested by reports of V. A. Buravikhin and V. G. Kazakov (ACCESSION NR. AP5011452) and M. K. Savchenko and others (ACCESSION NR. AP5011443), presented earlier at the Symposium on the Physics of Thin Ferromagnetic Films. Drawing on the work of other authors, the speaker attempts to explain the origins of alternating polarity of neighboring Bloch walls and the influence of stresses on the polarity of domain walls. The alternating polarity is traced to the nucleation process and the formation of spike domains. It is suggested that stress can give rise to additional stray fields at the Bloch walls. "In conclusion, the

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L 50978-65

ACCESSION NR: AP5011462

author expresses his gratitude to Ya. S. Shur for discussions and valuable remarks."
Orig. art. has: 3 figures.

ASSOCIATION: None

SUBMITTED: 00 ENCL: 00 SUB CODE: EM

NR REF SOV: 005 OTHER: 001

Card 2/2

ACC NR: AP6004479 EWT(1)/EWT(m)/T/EWP(t)/EWP(z)/EWP(b) LJP(c) JD/HW/GG

SOURCE CODE: UR/0048/66/030/001/0095/0098

AUTHOR: Telesnin,R.V.; Sarayeva,I.M.; Rybak, Ye.N.; Shishkov,A.G.

ORG: Physics Department, Moscow State University im. M.V.Lomonosov (Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta)

TITLE: On the contributions of different factors to the induced anisotropy of thin iron-nickel films /Transactions of the Second All-Union Symposium on the Physics of Thin Ferromagnetic Films held at Irkutsk 10 July to 15 July, 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v.30, no.1, 1966, 95-98

TOPIC TAGS: ferromagnetic film, magnetic thin film, iron, nickel, permalloy, magnetic anisotropy, magnetostriction, ordered alloy,

ABSTRACT: The purpose of the work was to determine the relative contributions of directed ordering of pairs of ferromagnetic atoms and unrelaxed magnetostrictive stresses to the induced magnetic anisotropy of thin iron-nickel films. Iron-nickel films of different composition were deposited at 2×10^{-5} mm Hg in a 500 Oe magnetic field at the rate of 400 Å/min onto optically polished glass substrates heated by radiation to different temperatures. The films were annealed in a magnetic field, and their magnetic anisotropy constants at different temperatures were measured with a torsion magnetometer, all without breaking the vacuum. For most of the films the anisotropy constant decreased with increasing temperature, although in some cases an

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L 15422-66

ACC NR: AP6004479

increase in anisotropy with increasing temperature was observed at temperatures above the deposition temperature. The anisotropy constant at fixed measuring temperature (19°) was plotted against the deposition temperature and was compared with the theoretical anisotropy due to magnetostrictive stresses calculated with the theory of F.G.West (J.Appl.Phys.,35,18 (1964)). Except for the films deposited at room temperatures, the theoretical and experimental anisotropy constants for the nickel films were in good agreement. The anisotropy constants of the alloy films were greater than predicted by the magnetostriction theory. The excess anisotropies were compared with the calculations of M.Prutton and E.M.Bradley (Proc. Phys.Soc., 75, No.4, 484.577 (1960)) based on the Neel-Taniguchi theory of directed ordering of pairs of iron atoms in the face-centered cubic Ni-Fe lattice. According to this theory, the anisotropy constant should be proportional to the square of the iron concentration in the alloy. Such a dependence of the residual anisotropy constant on the iron concentration was observed; the experimental parabola corresponded to a coupling constant of 2.3×10^{-16} erg.which is within the limits set by T.H.Van Vleck (Phys.Rev., 52, 1178 (1937)). It is concluded that the anisotropy of nickel films is due mainly to magnetostrictive stresses that cannot relax because of the adhesion of the film to the substrate, and that both magnetistrictive stresses and directed ordering of iron atom pairs contribute to the magnetic anisotropy of iron-nickel alloy films. Orig. art. has: 2 formulas and 6 figures.

SUB CODE: 20 SUBM DATE: 00 ORIG. REF: 000 OTH REF: 003

Card 2/2

L 13821-66 EWT(m)/EWA(d)/EWP(t)/EWP(z)/EWP(b) MJW/JD

ACC NR: AP6004480 UR/0048/66/030/001/0099/0102

AUTHOR: Il'icheva, Ye.N.; Kanavina, N.G.; Shishkov, A.G.

ORG: Physics Department, Moscow State University im. M.V.Lomonosov (Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta)

TITLE: Critical curves of thin Permalloy films /Transactions of the Second All-Union Symposium on the Physics of Thin Ferromagnetic Films held at Irkutsk 10 July to 15 July, 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 1, 1966, 99-102

TOPIC TAGS: ferromagnetic film, magnetic thin film, permalloy, Kerr effect, Faraday effect, magnetic coercive force, magnetic domain boundary, magnetization

ABSTRACT: By a critical curve is understood a curve giving the strength of the magnetizing field at which some feature of the switching process occurs as a function of the angle between the magnetizing field and the easy axis, plotted in polar coordinates or, what is the same thing, with the longitudinal (parallel to the easy axis) and transverse components of the magnetizing field as rectangular Cartesian coordinates. Critical curves for the nucleation field, for the field at which domain wall motion begins, and for the coercive force of 79NMA Permalloy films of different thicknesses were obtained with the aid of the Kerr and Faraday effects, using techniques that have been described elsewhere by the authors (Fiz. metallov i metallovedeniye, 20, No. 1

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ACC NR: AP604480

(1966)) and by the authors and R.V.Telesnin, O.S.Kolotov, and T.N.Nikitina (Izv. AN SSSR. Ser. fiz., 28, 572 (1964)). The nucleation fields were measured with films that had been magnetized to saturation along the easy axis; the fields for onset of domain wall motion were measured with demagnetized films. These curves are discussed at some length. For thick films the critical curves for onset of domain wall motion agreed with the formula of S.Middelhoek (J.Appl.Phys., 34, 1054 (1964)) for Neel walls; for thin films with a large angle between the magnetizing field and the easy axis the corresponding curves agreed approximately with Middelhoek's formula for Bloch walls. From a comparison of all the curves it is concluded that the coercive force depends on the ratio of the nucleation field to the field for onset of domain wall motion, and that the behavior of the critical curves for nucleation and for onset of domain wall motion depends on the type of domain walls in a film of given thickness. Orig. art. has: 2 formulas and 2 figures.

SUB CODE: 20 SUBM DATE: 00 ORIG REF: 005 OTH REF: 003

TS

Card 2/2

L 32777-66 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6012797 SOURCE CODE: GE/0030/66/014/002/0363/0370

AUTHOR: Telesnin, R. V.; Ilicheva, E. N.; Kanavina, N. G.; Shishkov, A. G.

ORG: Faculty of Physics, University of Moscow

TITLE: Domain wall creep rate in thin permalloy films [Contribution to the International Colloquium on Magnetic Thin Films held from 25 to 28 April 1966 in Jena]

SOURCE: Physica status solidi, v. 14, no. 2, 1966, 363-370

TOPIC TAGS: permalloy, metal film, creep, magnetic field

ABSTRACT: An analysis of the experimental dependence of the domain wall creep rate (V) on the intensity of magnetic fields in the "easy" (H_L) and "hard" (H_T) directions gives a characteristic exponential dependence of V on H_L with H_T constant. The parameters of the exponential $V(H_L)$ for films of different thickness are presented, and it is shown that one of the parameters should be the critical start field of the wall, $H_{w.st.}$, rather than the coercivity, H_c. It is shown that creep parameters vary when the sinusoidal bipolar alternating field along the "hard" axis is replaced by a unipolar magnetic field. Orig. art.

Card 1/2

SHISHKOV, P.F., dotsent, kand.tekhn.nauk; SHISHKOV, A.I., kand.tekhn.nauk

Problem of planning systems of dynamic braking of winches with tail-rope haulage on inclined workings. Vop. rud. transp. no.2:302-311 1957. (MIRA 14:4)

1. Dnepropetrovskiy gornyy institut.
(Winches—Brakes)

AUTHORS: Shafranov, V. P., Shishkov, A. I., Fursov, V. D., Petrenko, G. P. SOV, 105-58-9-9/31

TITLE: Large-Scale Testing of an Overburden Stripping Dragline Excavator Having a New Electric Drive System (Promyshlennyye ispytaniya vskryshnogo kanatno-kovshovogo ekskavatora s novoy sistemoy elektroprivoda)

PERIODICAL: Elektrichestvo, 1958, Nr 9, pp 43 - 46 (USSR)

ABSTRACT: Since 1946, dragline excavators of type ESh-4/40 (boom length 40 m, bucket capacity 4 cu.m) which are used in open pit coal and ore mining have been produced by the Soviet industry. Up to 1955, induction motors with phase rotors were used as a drive. However, a smooth starting or braking, and the flexibility required for changing load, could not be achieved with them. Therefore, production of an excavator of the same type but with a generator-motor drive, the generator being provided with three windings was taken up by the Novokramatorskiy mashinostroitel'nyy zavod (Novokramatorskiy factory for machine construction). This, however, involved substantially higher costs of electric equipment, and made an increase of the output of the power transformer

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necessary. Since 1957, these excavators have been manufactured with a new type of drive using induction motors. At the above-mentioned factory five of these excavators were produced in 1957, and in the same year one of these, viz., the excavator Nr 155, was tested under the direction of N.Ye.Kuvayev, university teacher at the department for mining electrical engineering of the association given below, in the Razdolskiy sernyy kombinat (Razdol sulphur trust). The main results of these tests are given here. As they show, the technical and operating data have been substantially improved by the new technical solutions found. New features were: Use of saturated reactors in the stator circuit of the reversible motor, inductive reactances in the rotor circuit of the main winch drive motor, and singlephase braking of that motor. There are 6 figures.

ASSOCIATION: Dnepropetrovskiy gornyy institut (Dnepropetrovsk Mining Institute)

SUBMITTED: January 22, 1958

SHISHKOV, A.I.

Multistage rheostat starting of motors using two time relays.
Izv. DGI 28:86-90 '58. (MIRA 11:10)
(Electric motors, Induction) (Automatic control)

KUVAYEV, N.Ye.; SHISHKOV, A.I.

Design of mechanical characteristics for hoisting induction motors in a diagram of dynamic braking with feedback. Izv. DGI 28:91-104 '58. (MIRA 11:10)

(Mine hoisting--Electric driving)

SHISHKOV, A.I., kand.tekhn.nauk; KUR'YAN, A.I., kand.tekhn.nauk; PETRENKO, G.I., inzh.

Calculation of static mechanical characteristics of an asynchronous motor with saturable reactors in the stator circuit. Elektrichestvo no.9:92-93 S '60. (MIRA 13:10)
(Electric motors, Induction)

SHISHKOV, A.I., kand.tekhn.nauk; KUR'YAN, A.I., kand.tekhn.nauk; PETRENKO, G.P., inzh.

Calculating the mechanical characteristics of an asynchronous motor considering the nonlinearity of the saturation throttle in stator circuits. Izv.vys.ucheb.zav.; gor.zhur. no.11:171-178 '60. (MIRA 13:12)

1. Dnepropetrovskiy ordena Trudovogo Krasnogo Znameni gornyy institut imeni Artema. Rekomendovana kafedroy gornoy elektrotekhniki Dnepropetrovskogo gornogo instituta.
(Electric motors, Induction)

DEMIN, A.M., kand. tekhn. nauk; CHERTKOV, V.K.; VASIL'YEV, M.V., kand. tekhn. nauk; YEFIMOV, I.P.; KOKH, P.I.; KMITOVENKO, A.T., dots.; PRISEDSKIY, G.V., inzh.; DUNAYEVSKIY, Yu.M.; VOLOTKOVSKIY, S.A., prof., doktor tekhn. nauk; KUR'YAN, A.I., kand. tekhn. nauk; MAYMIN, S.R., kand. tekhn. nauk; MIROSHNIK, A.M., kand. tekhn. nauk; PETROV, I.P., kand. tekhn. nauk; TURYSHEV, B.F., kand. tekhn.nauk; SHISHKOV, A.I., kand. tekhn. nauk; AVERBUKH, I.D., inzh.; VARSHAVSKIY, A.V.; KRYUKOV, D.K.; LUKAS, V.A.; MINEYEV, V.A.; SMIRNOV, A.A., otv. red.; LYUBIMOV, N.G., red. izd-va; MAKSIMOVA, V.V., tekhn. red.

[Handbook for the operator and mechanic of open-pit mine equipment] Spravochnik mekhanika ugol'nogo kar'era. Moskva, Gos. nauchno-tekhn.izd-vo lit-ry po gornomu delu, 1961. 639 p. (MIRA 15:3)

(Strip mining--Equipment and supplies)
(Coal mining machinery) (Electricity in mining)

DEMIN, A.M., kand. tekhn. nauk; CHERTKOV, V.K.; VASIL'YEV, M.V., kand. tekhn. nauk; YEFIMOV, I.P.; KOKH, P.I.; KMITOVENKO, A.T., dots.; PRISEDSKIY, G.V., inzh.; DUNAYEVSKIY, Yu.N.; VOLOTKOVSKIY, S.A., prof., doktor tekhn. nauk; KUR'YAN, A.I., kand. tekhn. nauk; MAYMIN, S.R., kand. tekhn. nauk; MIROSHNIK, A.M., kand. tekhn. nauk; PETROV, I.P., kand. tekhn. nauk; TURYSHEV, B.F., kand. tekhn.nauk; SHISHKOV, A.I., kand. tekhn. nauk; AVERBUKH, I.D., inzh.; VARSHAVSKIY, A.V.; KRYUKOV, D.K.; LUKAS, V.A.; MINEYEV, V.A.; SMIRNOV, A.A., otv. red.; LYUBIMOV, N.G., red. izd-va; MAKSIMOVA, V.V., tekhn. red.

[Handbook for the operator and mechanic of open-pit mine equipment] Spravochnik mekhanika ugol'nogo kar'era. Moskva, Gos. nauchno-tekhn.izd-vo lit-ry po gornomu delu, 1961. 639 p. (MIRA 15:3)

(Strip mining--Equipment and supplies)
(Coal mining machinery) (Electricity in mining)

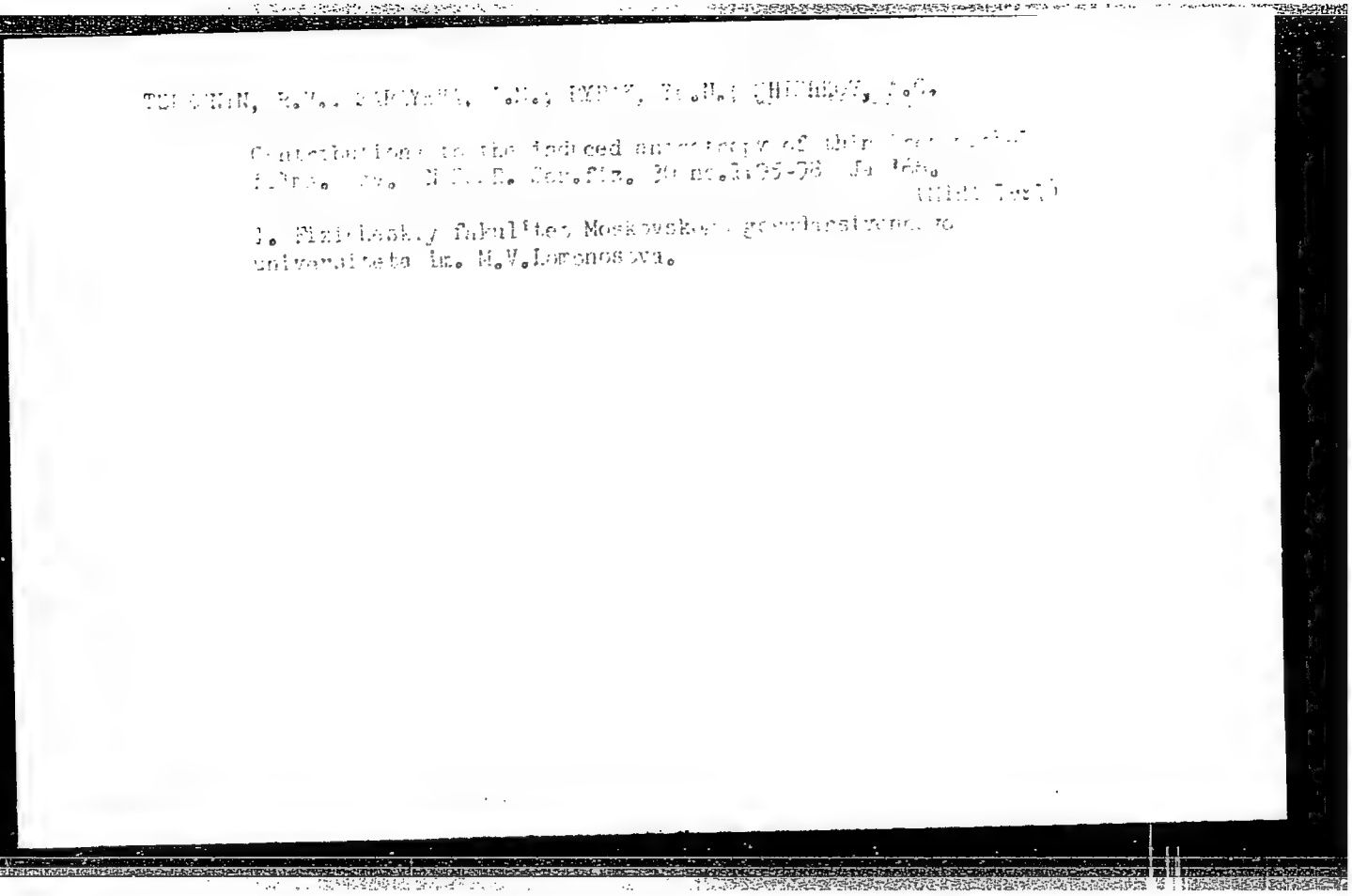
PRAVITSKIY, Nikolay Klement'yevich. Prinimal uchastiye SHISHKOV, A.I., dots.; KISILEV, V.I., prof., doktor tekhn. nauk, retsenzent; KLEYEROV, M.F., dots., kand. tekhn. nauk, retsenzent; PLOTNIKOV, K.S., kand. tekhn. nauk, otv. red.; D'YAKOVICH, G.B., red. izd-va; BOLDYREVA, Z.A., tekhn. red.

[Mine hoisting apparatus] Rudnichnye pod"emnye ustanovki. Moskva, osgortekhizdat, 1963. 416 p. (MIRA 16:9)
(Mine hoisting)

VOLOTKOVSKIY, Sergey Andronikovich, doktor tekhn. nauk, prof.; SHAFRANOV, Vitaliy Pavlovich, kand. tekhn. nauk, dotsent; SHISHKOV, Aleksey Ivanovich, kand. tekhn. nauk, dotsent

Calculation of the static characteristics of the drive system of an excavator in a generator-motor system with three generator excitation windings. Izv. vys. ucheb. zav.; elektromekh. 6 no.9:1113-1114 '63. (MIRA 16:12)

1. Zaveduyushchiy kafedroy gornoy elektrotekhniki Dnepropetrovskogo gornogo instituta (for Volotkovskiy). 2. Dnepropetrovskiy sel'skokhozyaystvennyy institut (for Shafranov). 3. Dnepropetrovskiy gornyy institut (for Shishkov).



ILICHEVA, Ye.N.; KANAVINA, N.G.; CHISHKOV, A.G.

Critical curves for thin Permalloy films. Izv. AN SSSR. Ser.fiz. 30 no.1:99-102 Ja '66. (MIRA 19:1)

1. Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta.

LEAPLYNV, B. G.; STUKAN, R. A.; SHVEICHIKOV, A. I.; SHISHKOV, A. V.

"The formation of polymeric products in reactions of polyvalent recoil atoms."

report presented at IAEA Symp on Chemical Effects associated with Nuclear Reactions and Radioactive Transformations, Vienna, 7-11 Dec 64.

Inst of Physical Chemistry, AS USSR.

DZANTIYEV, B.G.; KISELEVA, N.N.; SHISHKOV, A.V.

Developing the methods of hot synthesis of sulfur-35 labeled biologically active substances. Part 3: Preparation of triethyleniminothiophosphoramide with a sulfur-35 and phosphorus-32 double tag. Radiokhimiia 7 no.3:366-368 '65. (MIRA 18:7)

SHISHKOV, B.

Method for calculating the operating expenditures for running trains. p. 347.

IZVESTIIA. Bulgarska akademiia na naukite. Teknicheski institut. Sofiia, Bulgaria, Vol. 7/8, 1959.

Monthly list of East European Accessions (EEAI) LC, Vol. 9, No. 1, January 1960.

Uncl.

GORBUNOV, V.P., inzh. (Leningrad); KOROTKOV, S.V., kand. tekhn. nauk (Leningrad); SHISHKOV, B.A., inzh. (Leningrad)

Design of composite systems with two motor drives. Elektrichestvo no.7: 74-79 Jl '65. (MIRA 18:7)

SHISHKOV, B. I.

119-6-7/16

AUTHOR: Shishkov, B. I.

TITLE: Technology and Production Organization (Tekhnologiya i organizatsiya proizvodstva).
Exact Punching of Workpieces of Very Small Thickness (Tochnaya vyrubka izdeliy vesima malykh tolshchin).

PERIODICAL: Priborostroyeniye, 1957, Nr 12, pp. 19-22 (USSR)

ABSTRACT: In punching thin workpieces (< 0,2 mm) the following difficulties have to be reckoned with: 1) the necessity of guaranteeing a uniform clearance over the entire outline of the workpiece; 2) the increased surface-deformation; 3) the difficulty of obtaining finless products; 4) the small wearability of the punching tools. Special care and precision in the designing and manufacturing of punching tools as well as their best utilization possible are the main conditions for a satisfactory punching of thin workpieces. In figure 1 quite a number of workpieces of brass and steel with a thickness of 0,02 - 0,20 mm is represented. Flat springs of various shape are expediently punched from a band which is previously hardened and drawn (usually at Rc = 45 ÷ 55). In this case punching can be done with larger tool-clearances

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which practically is easier to be done. In punching self-hardening steel of 0,12 mm thickness the clearance of the punching tool, e.g., must on every side be 0,006 mm, in the case of heat-treated steel of the same thickness, however, if may amount to 0,025-0,03 mm on one side. The cutting steadiness of the punching tool in punching heat-treated steel proves to be 20-25 % higher than in punching natural steel. The punching of such workpieces is economically expediently carried out on double-acting punches, simultaneously at the periphery and the holes. Such a double-acting die is shown in figure 2 and then described. In figure 3 the component parts of the upper exchangeable tool are shown and their manufacturing method is described. In order to guarantee a high precision of the coupling of punch and matrix, the method of the broaching of the contour-punch by the matrix is employed. In figure 4 a die for the punching of a certain part (figure 1) with one blow is shown and then described and in figure 5 a die for the punching of teeth of a clockwork-gear. Workpieces of nonferrous metals (brass, duraluminum, copper) whose thickness is less than

Technology and Production Organization. 119-6-7/16
Exact Punching of Workpieces of Very Small Thickness

0,03 mm are expediently punched from bands folded together to 2-3 layers. For a correct working of the dies they must always be kept clean and without traces of oil. The punch, the matrix and the steel-parts connected with them must be carefully demagnetized, in order to avoid an adherence of the punched steel products. After the punching of 2000-3000 workpieces it is commendable to take the working parts of the die apart, clean them with benzine and, if necessary, repair damaged and dulled places. There are 5 figures.

AVAILABLE: Library of Congress.

Card 3/3

AUTHOR: Shishkov, B. I., Professor 107/119-58-9-6/18

TITLE: Experience With Inside Broaching of Teeth in a Round Shaft (Opyt vnutrennego protyagivaniya zub'yev v kruglom valike)

PERIODICAL: Priborostroyeniye, 1958, Nr 9, pp. 20-21 (USSR)

ABSTRACT: The original broaching device was developed in cooperation with the collective of a factory at Yuzhnyy Ural. The design of the broaching device was substantially improved by the Moscow tool factory, with the particular aim of using as little P-18 steel as possible since there is a shortage in this steel brand. While the total shaft length is 525 mm, the P-18 steel is used over a length of 300 mm, the ends being manufactured from 40 X brand steel. Constructional details are given for the shaft by means of tables and figures. Under existing machining conditions, 1500 gear wheels are manufactured. The device must stand manufacture of 500 000 - 750 000 pieces.
The broaching device costs 1500 roubles, the [illegible] costs per piece being 0.21 - 1.2 co[illegible]
Card 1/ milling device, costs for the same [illegible] 10 copecks.

[illegible] with Inside Rotating of Teeth in [illegible] and Draft SOV/[illegible]

As compared with milling, broaching has the great advantage that the accuracy class is remarkably higher. According to experience made so far, broaching of gear wheels can be carried out for a modulus smaller than 0.37 mm. There are 2 figures and 1 table.

Card 2/2

Shishkov B

25(1) PHASE I BOOK EXPLOITATION SOV/2305

Chelyabinsk. Politekhnicheskiy institut

Voprosy teorii i praktiki obrabotki metallov davleniyem (Problems in the Theory and Practice of Metal Forming) Moscow, Mashgiz, 1959.
103 p. (Series: Its: [Sbornik] vyp. 14) Errata slip inserted. 5,000 copies printed.

Reviewers: V.B. Skornyakov, Candidate of Technical Sciences, V.G. Belakin, Engineer, N.A. Bedin, V.A. Korshunov, I. I. Kozhinskiy, L.A. Kritsshteyn, B. N. Malyarovskiy, M.A. Shubik, and D. I. Fishman; Ed.: V.N. Vydrina, Candidate of Technical Sciences; Exec. Ed. (Ural-Siberian Division, Mashgiz): A.V. Kaletina, Engineer; Tech. Ed.: N.A. Dugina.

PURPOSE: The collection of articles is intended for engineers, technicians, and scientific workers in metal forming.

COVERAGE: This collection of articles, written by staff members of the Chelyabinskiy politekhnicheskiy institut (Chelyabinsk Polytechnical Institute), deals with problems on the theory, processes, and equipment of metal forming.

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Problems in change of shape and state of stress of parallelepipeds and cylindrical bodies subjected to flattening in plane parallel forging heads are discussed. The essentials of the theory of the interaction between strip and roll, and the question of slip along contact surfaces during rolling are explained. An analytic method for the kinematic design of steam-distribution mechanisms for steam hammers is presented. Precision stamping of thin-walled parts of intricate shape is described. An investigation of the function of repeaters in in-tandem rolling mills is discussed. An article on the testing of electric heating furnaces is also included. No personalities are mentioned. References follow several of the articles.

TABLE OF CONTENTS:

Problems in the Theory and Practice of Metal Forming SOV/2305

SHISHKOV, B.I., inzh.

Precision stamping of thin intricately shaped parts. Sbor. st. CHPI no.14:76-82 '59. (MIRA 12:9)
(Sheet-metal work)

PHASE I BOOK EXPLOITATION SOV/5454

Shishkov, Boris Ivanovich

Tochnaya shtampovka v priborostroyenii (Precision Stamping in Instrument Manufacture) Moscow, Mashgiz, 1960. 270 p. 12,000 copies printed.

Reviewer: V. V. Ivanov, Engineer; Tech. Ed.: N. A. Dugina; Executive Ed. of Ural-Siberian Department (Mashgiz): M. A. Bezukladnikov, Engineer.

PURPOSE : This book is intended for production engineers and designers; it may also be useful as an aid for students in schools of higher education.

COVERAGE: The book deals with modern methods of precision stamping. Designs of the dies and presses used for precision stamping in instrument manufacture are analyzed. Attainable stamping accuracy, ways for increasing such accuracy, and the use of a plasticized hard alloy in making precision dies are discussed. The following are also considered: the process of making the cutting parts

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of dies, the calculation of shrinkage of plasticized blanks, and the analytical calculation of errors in center-to-center distances and in coaxiality of gaged holes. No personalities are mentioned. There are 27 references, all Soviet.

TABLE OF CONTENTS:

SHISHKOV, D.

The LZ2KCS (Amateur Radio Station) Participating in the Contest of September 4, 1955. "RADIO" Ministry of Communications, #10:12:Oct. 55

BULGARIA

RACHEV, R., Dr, SHISHKOV, D., Dr, and KAROV, B., Dr, District Veterinary Hospital (Okruzhna veterinarna lechebna,) Kolarovgrad.

"Gastrotomy Treatment of Angora Rabbits with Pilobezoar."

Sofia, Veterinarna Sbirka, Vol 60, No 6, 1963; pp 22-23.

Abstract: When 15 pregnant rabbits became gravely ill in rabbit farm, 5 were 'hospitalized'; when the first one died, necropsy revealed large bezoar containing mainly rabbit hair; then the other 4 were operated but all of these died too. Disease is attributed to lack of hygiene and unbalanced diet; deaths to delay in surgery.

IVANOV, D.; SHISHKOV, D.

Phase equilibriums in the system: copper ammonium acetate and copper ammonium carbonate solution-carbon monoxide under general pressures of 100, 200, and 300 kg/cm^2. Godishnik khim tekh 9 no.2:87-102 '62 [publ. '63].

SHISHKOV, D.; SHISHKOVA, L.

Chromatographic separation of vanadium from titanium.
Doklady BAN 16 no. 8: 833-836 '63.

1. Submitted by Academician D. Ivanoff [Ivanov, D.]. Chlen Redaktsionnoy kollegii, "Doklady Bolgarskoy Akademii nauk".

SHISHKOV, D.; SHISHKOVA, L.

Chromatographic separation of molybdenum from vanadium.
Doklady BAN 16 no.2:173-176 '63.

1. Submitted by Academician D. Ivanoff [Ivanov, D.].

SHISHKOV, D.; SHISHKOVA, T.

Separation of molybdenum from titanium by means of ion-exchange chromatography. Doklady BAN 17 no.2: 137-140 '64.

1. Submitted by Academician D.Ivanoff [Ivanov, D.].

SHISHKOV, D.; PETEVA-IORDANOVA, S.[Peteva-Iordanova, S.]

Ion-exchange separation of germanium (IV) from vanadium (V) and titanium (IV). Doklady BAN 17 no.11:1027-1030 '64.

1. Institute of Mining Geology, Sofia-Durvenitsa. Submitted July 23, 1964.

L 00158-66 EWP(j)/ETC/EWC(m)/EWP(t)/T/EWP(t) IJP(c) RM/DS/JD/JG
ACCESSION NR: AP5025539 BU/0011/65/018/003/0223/0226

55 55 49 47 B

AUTHOR: Shishkov, D.; Koleva, E.

TITLE: Study of the behavior of tungsten(VI) in acetic acid solutions of ion-exchange resins

SOURCE: Bulgarska akademiya na naukite. Doklady, v. 18, no. 3, 1965, 223-226

TOPIC TAGS: tungsten, acetic acid, solution property, ion exchange resin, ion exchange

ABSTRACT: /English article/ Although the ion exchange method is widely used for the study of the properties of metallic ions, the properties of tungsten in the presence of complex-binding substance have not been studied in detail yet. Consequently, the tungsten behavior in acetic acid has been studied. Cationites KY-1 and KY-2 and wofatite CN in H-, Na-, and NH_4 forms as well as anionites EDE-10 and EDE-10p in acetate form were used. The characteristics and method of application of the above resins were studied by the same authors (Compt. rend. Acad. bulg. Sci., 18, 1965, No 4). Here they present curves showing the amount of absorbed W. Orig. art. has: 4 graphs.

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L 00158-66

ACCESSION NR: AP5025539

2

ASSOCIATION: Mining and Geological Institute, Darvenitsa, Sofia

55

SUBMITTED: 00 ENCL: 00 SUB CODE: IC, GC

NR REF SOV: 000 OTH REF: 006 JPRS

Card 2/2

L 00157-66 EWP(j)/ETC/EWG(m)/T RM/DS

ACCESSION NR: AP5025540 BU/0011/65/018/003/0231/0233

AUTHOR: Shishkov, D.; Velcheva, B.

TITLE: Behavior of tungsten (VI) in melonic acid solution of ion-exchange resins

SOURCE: Bulgarska akademiya na naukite Doklady, v. 18, no. 3, 1965, 231-233

TOPIC TAGS: tungsten, solution property, ion exchange, ion exchange resin

ABSTRACT: /English article/ With the increase in atomic weight the complex-forming capability of elements increases also. Consequently, tungsten (VI) has more pronounced properties in comparison with molybdenum (VI). However, the complex formations of tungsten (VI) in presence of organic acids in aqueous solutions utilizing ion exchange have not been previously fully studied. Thus the authors recently investigated systems containing HCOOH-CH_3COOH-, $H_2C_2O_4$-, and H_3 cit $-H_2O$ (Compt. rend. Acad. bulg. Sci., 17, 1964, No. 10, 905; Ibid., 17, 1964, No. 10, 909). The present paper reports on studies of tungsten behavior in malonic acid solution representing the complex forming agent of various ion-exchange resins in different forms. Cationites

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L 00157-66

ACCESSION NR: AP5025540 2

KY-1, KY-2, and CN in H-, Na-, and NH_4-form were used as well as the anionites EDE-10 and EDE-10p in malonic form. The conversion of the resin into the corresponding form and the static treatment method have been described (Zh. neorg. khim., 1965). The results of the present investigation are presented in the form of tungsten absorption graphs. Orig. art. has: 3 graphs.

ASSOCIATION: Mining and Geological Institute, Darvenitsa, Sofia

SUBMITTED: 00 ENCL: 00 55 SUB CODE: IC, GC

NR REF SOV: 003 OTHER: 003 JPRS

Card 2/2 KC

L 00156-66 ETC/EWP(j)/EWG(m)/T RM/DS

ACCESSION NR: AP5025541 BU/0011/65/018/003/0235/0238

AUTHOR: Shishkov, D.; Shishkova, L.

TITLE: Anion-exchange behavior of molybdenum (VI) in hydrochloric acid alchol solutions

SOURCE: Bulgarska akademiya na naukite. Doklady, v. 18, no. 3, 1965, 235-238

TOPIC TAGS: molybdenum, hydrochloric acid, alchol, solution property, ion exchange, ion exchange resin

ABSTRACT: /English article/ In a previous paper (Talanta, 1965) the authors investigated the behavior of molybdenum in hydrochloric acid alcohol solutions of the strongly acid polymerizational cationite KY-2 in H-form. An investigation under the same conditions of the anion-exchange behavior of molybdenum seemed of interest as its properties have as yet not been studied. The strongly alkali anionite EDE-10 in Cl-form which possesses a number of advantages and valuable properties was used as ion-exchange resin. The paper presents the logarithms of the coefficients of distribution Kd as function of N HCl for

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L 00156-66
ACCESSION NR: AP5025541

2

increasing alcohol concentrations. The results show that with an increase in the acidity of the solution and the percentage of the alcohol the absorption of molybdenum decreases. Orig. art. has: 4 graphs.

ASSOCIATION: Mining and Geological Institute, Darvenitsa, Sofia

SUBMITTED: 00 ENCL: 00 SUB CODE: IC, GC

NR REF SOV: 003 OTHER: 006 JPRS

Card 2/2

L 15612-66 EWT(F)/EWG(m) DS/RM
ACC NR: AP6008205 SOURCE CODE: BU/0011/65/018/004/0323/0326

37
B

AUTHOR: Shishkov, D.; Koleva, E.

ORG: none

TITLE: Study of the behavior of molybdenum (VI) in acetic acid solution of ion-exchange resins 55

SOURCE: Bulgarska akademiya na naukite. Doklady, v. 18, no. 4, 1965, 323-326

TOPIC TAGS: molybdenum compound, ion exchange resin, acetic acid, organomolybdenum compound, molybdenum

ABSTRACT: The present paper forms a part of a series of studies on the state of molybdenum (VI) in various organic acid solutions (see, e.g., Compt. rend. Adac. bulg. Sci., 17, 1964, No. 10, 909; Ibid., 17, 1964, No. 10, 905). Since these earlier investigations did not produce firm conclusions concerning the complex forms of Mo(VI), the authors turned to the acetic acid solution and applied the ion exchange method for the study of molybdenum complex formation in acetic acid when the acidity of the solution was kept constant in the Na_2MoO_4-CH_3COOH-H_2O at 0.1 geq/l. The curves obtained enable one to trace the kind of complexes formed,

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L 15612-66
ACC NR: AP6008205

the limits of the molecular ratio of Na_2MoO_4 and CH_3COOH within which they are formed, and the way they are absorbed by the cationite and anionite. This paper was submitted by Academician D. Ivanov, 09 November 1964. Orig. art. has: 4 figures.
[JPRS]

SUB CODE: 07 / SUBM DATE: none / ORIG REF: 003 / OTH REF: 003

Card 2/2

SHISHKOV, D.

TECHNOLOGY

Periodical: GODISHNIK. Vol. 2, no. 2, 1954/55 (published).

SHISHKOV, D. Contribution to the study of spectrophotometric determination of tungsten in ores. p. 147.

Monthly List of East European Accession (EEAI), LC., Vol. 8, no. 2, February 1959, Unclass.

SHISHKOV, D.

15

Application of powdered limestone in order to decrease the hygroscopicity of ammonium saltpeter. K. Kulsiev and D. Shishkov. *Khim. i Ind.* (Sofia) 29, No. 1, 18-25(1957). —The hygroscopicity of tech. NH_4NO_3 (I) can be decreased by the addn. of $CaCO_3$ (II), and, if identical grain sizes are compared, the reduction of the hygroscopicity is proportional to the dose of II, up to 100% of a II addn. If the II powder is coarsely cryst. only a small loss of N from the I can be brought about. Part of the II can be replaced by kaolin, and results are almost as good. Werner Jacobson

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Distr: 4E2c

111

[illegible], L. A.

"Twenty years of ion-exchange chromatography in analytic cheristry."

[illegible]. 10. (Khimiia i Industriia, Vol.30, no. 1, 1958, Sofia, Bulgaria)

Monthly Index of East European Accessions (MEAI) LC, Vol. 7, No. 12, Dec 58

Chromatographic separation of tungsten from vanadium and chromium in the analysis of ores and alloys. D. A. Shishkov. *Khim. i Ind.* (Sofia) 31, No. 3, 75–7(1959).—W (0.005–1.5%) in the presence of up to 0.1% V and 0.3% Cr can be detd. by colorimetric methods. In ores and alloys these elements are found in greater quantities. This necessitates the sepn. of W from the others by sedimentation processes, requiring costly reagents and is time consuming without the necessary exactness. The present work is based on the differences in stability of the chloride complexes of W, V, and Cr. At pH 1, W forms ψ-wolframate, $H_3W_5O_{21}^{3-}$, V forms VO_2^+, and Cr forms Cr^{+++}. The cationic exchange media are KU-2 and SH^+, the anion EDE-10P. For ores, 0.2 g. ore contg. W, V, and Cr is weighed, boiled in a Ni crucible with Na_2CO_3 and KNO_3 at 852° for 40 min., washed with hot, distd. H_2O, and the soln. is neutralized with concd. HCl to pH 1. The residue is filtered and washed 3–5 times with 0.1*N* HCl. The filtrate is passed through columns contg. KU-2 or SH^+ at 3 ml./min. The column is washed with 50 ml. 0.1*N* HCl. V is absorbed, but W and Cr pass through in the filtrate which is put through the column contg. EDE-10P at 3 ml./min. Both W and Cr are absorbed. The column contg. EDE-10P is washed with 250 ml. 8*N* HCl. The soln. is evapd. to 30 ml., transferred to a 50-ml. flask, and added are 2.5 ml. 30% KSCN, 15 ml. concd. HCl, and approx. 0.2 ml. 0.1*N* $TiCl_3$. The soln. is homogenized for 5 min. and analyzed on a Pulfrich photometer. For alloys, 0.1 g. alloy, dissolved in aqua regia, is evapd. until the liberation of N oxides. The soln. is dild. with 50 ml. distd. H_2O and neutralized with HCl to pH 1. The residue is filtered, washed 3–4 times with 0.1*N* HCl, and transferred to a 200-ml. flask. A 50-ml. aliquot is passed through columns contg. KU-2 and SH^+ at 3 ml./min., passing the subsequent soln. through the column contg. EDE-10P as mentioned above for ores. To the filtrate contg. W is added 50 ml. concd. HCl and approx. 10 ml. 0.5% gelatin; the soln. is heated in a H_2O bath for 1 hr., filtered, and washed with hot HCl. The residue is hardened at 700–800°, tempered, and weighed. W is calcd. as follows: $W = (0.7939A\ (100))/P$ where W = W in %, A = wt. of WO_3 in g., and P = wt. of sample.

Y. Himelbloom

SHISHKOV, D.A.

Determining exchange capacity of synthetic ion-exchange substances under dynamic conditions. Godishnik Min geol inst 7 no.1:189-201 '60/'61.

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Dynamic activity of the anion-activated alumimum oxide in respect to tungsten and molybdemum. Godishnik Min geol inst 7 no.1:213-220 '60/'61.

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Quantitative separation of tungsten (VI), molybdenum (VI), vanadium (V), and chromium (III) by ion-exchange chromatography. Godishnik Min geol inst 7:486-509 '60/'61 [publ. '62].

[redacted]

[redacted] separation of wolfram(VI), molybdenum (VI), vanadium (V), and chromium (III) by ion exchange chromatography. Pt. 2. [redacted] Min geol inst 8:447-460 '61-'62 [publ. '63]

SHISHKOV, D.A.; SHISHKOVA, L.G.

Ion-exchanging separation of molybdenum from vanadium in the analysis of ores. Khim i industriia 35 no.6:210-211 '63.

SHISHKOV, D.; SHISHKOVA, L.

Anion-exchange separation of tungsten from titanium. Doklady BAN 17 no.3:243-246 '64.

1. Submitted by Academician D.Ivanoff [Ivanov, D.].

[illegible] V. D.; [illegible], N.

Study of the behavior of molybdenum (VI) and tungsten (VI) in oxalic acid solution of ion-exchange resins. Doklady AN [illegible] no.10: 905-908 [illegible].

1. Submitted Nov 5, 1964.

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Study of the behavior of molybdenum (VI) and tungsten (VI) in citric acid solution of ion-exchange resins. Doklady BAN 17 no.10:909-912 '64.

1. Submitted May 16, 1964.

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Chromatographic separation of molybdenum from vanadium. Godishnik Min geol inst 9:393-399 '62-'63[publ. '64].

Anion-exchange separation of wolfram from titanium. Ibid.:401-403

Separation of molybdenum from titanium by the method of ion-exchange chromatography. Ibid.:405-415

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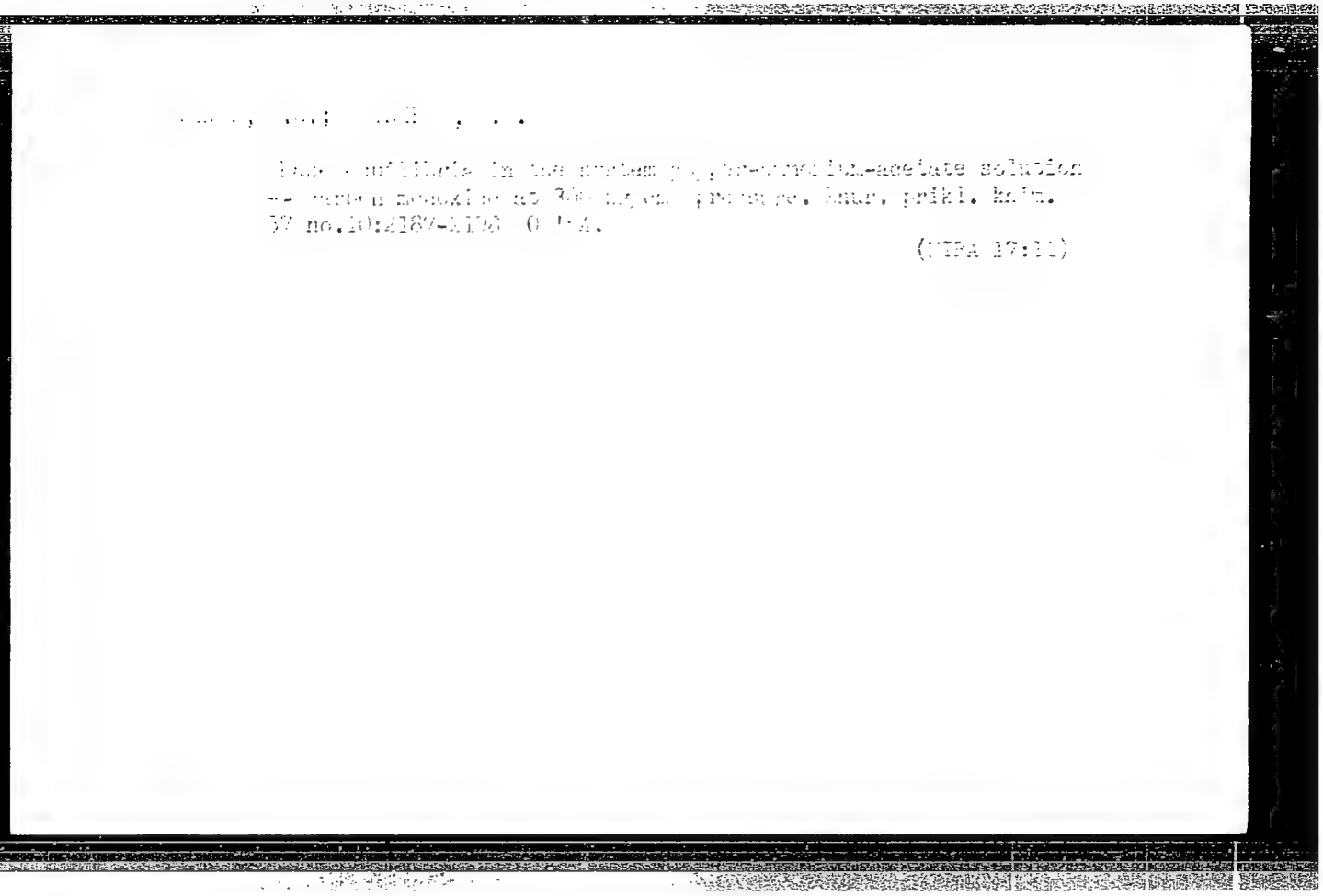
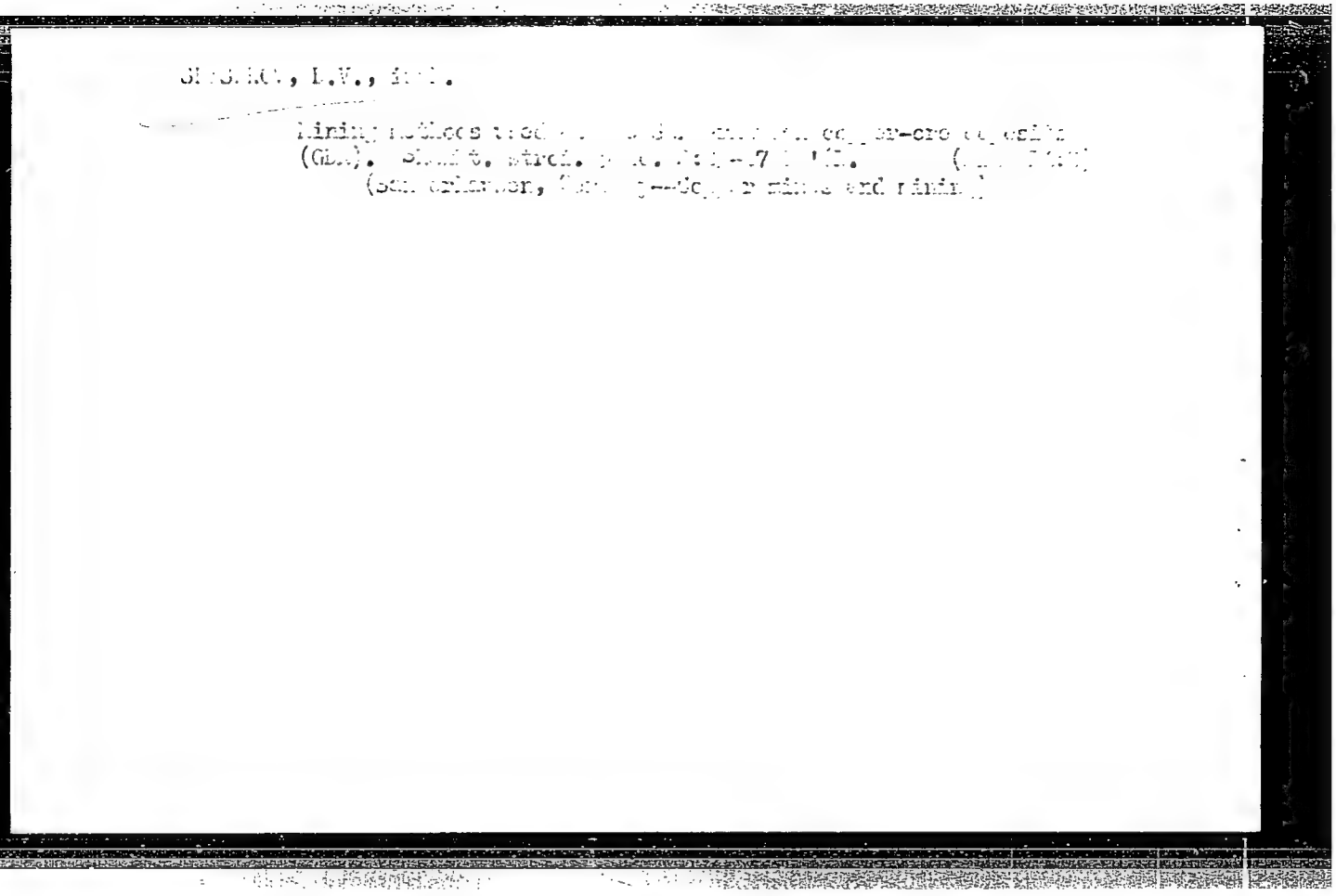
Quantitative separation of wolfram(VI), molybdenum (VI), vanadium(V), and chromium (III) by ion-exchange chromatography. Pt. 3. Godishnik Min geol inst 9:385-391 '62-'63[publ. '64].





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Parallel work in shaft sinking in the German Democratic Republic [translated from the German; from "Bergbautechnik", October, 1960]. Shakht. stroi. 5 no.6:28-32 Je '61. (MIRA 14:6)
(Germany, East--Shaft sinking)

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Using water to reduce the dust content of air in mines (from "Bergbautechnik," no.5, 1961). Shakht.stroi. 6 no.2:31-32 F '62. (MIRA 15:2)

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History of the development and present state of the technology of boring mine shafts and large-diameter bore holes. Shakht.-stroi. 6 no.9:27-31 S '62. (MIRA 15:9)
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Mechanization of charging and stemming of boreholes. Shakht. stroi. 7 no.6:27-29 Je '63. (MIRA 16:7)

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